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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/398,006	09/16/1999	YOICHI OKAMOTO	Q55806	9551

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EXAMINER	
FISCHER, JUSTIN R	

ART UNIT	PAPER NUMBER
1733	

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/398,006	OKAMOTO ET AL.
	Examiner	Art Unit
	Justin R Fischer	1733

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 July 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,5-7,24 and 25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,5-7,24 and 25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3-5, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnsworth (GB 1,483,053, of record) in view of Kohno (US 5,968,295, of record) and optionally in view of Gaudin (US 5,591,284, newly cited). Farnsworth, Kohno, and Gaudin are applied in the same manner as set forth in the non final rejection mailed on April 22, 2004 (Paragraphs 3-5).

Farnsworth, as best depicted in Figure 1, substantially teaches the pneumatic tire construction of the claimed invention, including a belt assembly formed of a radially innermost steel belt layer 4, a middle steel belt layer 3, and an outermost, high angled steel belt layer 2, is narrower than the radially innermost steel cord layer. In describing the axial extent of the belt assembly as a whole, Farnsworth suggests that said belt assembly has a maximum axial width between 90 and 110% of the axial width of the tread (Page 1, Lines 94-96). Although Farnsworth fails to depict the inclusion of tread grooves, one of ordinary skill in the art at the time of the invention would have expected the tire of Farnsworth to contain a plurality of tread grooves as is conventional in pneumatic tires and furthermore, in view of the above noted range, one would have

expected the outer ply to extend outward of the outermost tread groove. As to the axial widths of the respective plies, while Farnsworth fails to expressly require the outermost ply have an intermediate width (in relation to inner and middle ply), a fair reading of Farnsworth suggests that a wide range of belt assemblies having varying widths is within the scope of Farnsworth- in particular, the reference places no criticality on which belt ply is the widest or the narrowest, as evidenced by Figures 1-3C. As such, one of ordinary skill in the art at the time of the invention would have found it obvious to form the outer ply narrower than the innermost ply and wider than the middle ply, there being no conclusive showing of unexpected results to establish a criticality for this relationship. Gaudin is optionally applied to evidence that it is known in the tire industry to stagger the ends of belt plies in order to avoid the buildup of stresses (Column 1, Lines 35-45) and furthermore, it is known in the tire industry that any of a wide number of belt arrangements having varying axial widths provide a suitable belt construction (Column 2, Lines 24-32 and Figures 6-11). It is emphasized that the belt construction of Gaudin depicted in Figures 6-11 is extremely similar to that of Farnsworth in that three steel plies are included. Lastly, regarding the compression modulus of the coating rubber, one of ordinary skill in the art at the time of the invention would have readily appreciated the broad range of the claimed invention (greater than **200 kgf/cm^2**) as defining extensively used coating rubber compositions in similar belt plies. Kohno, for example, is directed to a similar tire construction having an outermost belt layer that can be formed of steel in which the coating rubber has a compression modulus greater than **200 kgf/mm^2** in order to prevent the cords of this belt layer from moving and causing

local buckling of said cord (Column 4, Lines 47-55). Thus, Kohno suggests a minimum value for the compression modulus that is **100 times greater** than that required by the claimed invention, such that one of ordinary skill in the art at the time of the invention would have readily appreciated the claimed range of "at least 200 kgf/cm^2". It is further noted that applicant similarly attributes the benefits of reducing buckling fatigue to the inclusion of a coating rubber having a compression modulus of at least 200 kgf/cm^2 (Page 9, 2nd Paragraph). As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to form the coating rubber of the outermost layer of Farnsworth with a compression modulus of at least 200 kgf/cm^2 as such a construction is extensively used in the outermost belt plies formed of steel for the benefits detailed above, as shown for example by Kohno.

Regarding claims 1, 3-5, 24, and 25, Farnsworth depicts multiple embodiments in which the high angled layer is the outermost layer (Figures 1, 3B, and 3C). While no single embodiment depicts the high angled layer as being both narrower than the innermost layer and wider than the middle layer, it is clearly evident that Farnsworth places no criticality on the axial extent of the outer, high angled layer in relation to the inner and middle layers, only stating that the maximum axial width of the belt assembly (as a whole) is in the range of 90 to 110% of the tread width. The specific selection of an embodiment in which the high angled layer is wider than the middle layer and narrower than the innermost layer would have been within the purview of one of ordinary skill in the art at the time of the invention, particularly since it is well known to stagger the ends of belt plies so stresses do not buildup at the ply ends. Gaudin has

been optionally applied to evidence this point and furthermore, to illustrate the use of a variety of suitable, belt configurations in regards to the width of the respective plies. In order to satisfy the claimed invention, for example, the inner layer in either Figure 3B or 3C would have to be extended beyond the outer layer or the outer layer in Figure 1 would have to be extended beyond the middle layer. Thus, since Farnsworth describes a plurality of embodiments in which the axial extent of the respective plies is axially varied and Farnsworth fails to suggest a criticality in any specific arrangement, it would have been obvious to one of ordinary skill in the art at the time of the invention to form a belt assembly as defined by the claimed invention, there being no conclusive showing of unexpected results to establish a criticality for this arrangement. **It is noted that applicant points to Pages 22 and 23 of the original disclosure for support of unexpected results; however, the original disclosure only states that the benefits of cut resistance and separation resistance result from the outermost cord layer being wider than the middle cord layer- the original disclosure fails to associate any criticality to the relationship between the outermost cord layer and the innermost cord layer. In this regard, Farnsworth depicts multiple embodiments (Figures 3B and 3C) in which the outermost, high angled cord layer is wider than the middle cord layer.**

As to the limitation requiring the outermost layer be between 1.0 and 1.2 times the axial width of the middle cord layer, both Figures 3b and 3c of Farnsworth depict a construction in which the high angled layer covers the middle cover and contains an axial width that is slightly staggered outward of the end of the middle cord layer. One of

ordinary skill in the art at the time of the invention would have recognized that the amount of staggering is on the order of a couple of millimeters and well within the broad range of values that allows up to a 20% staggering. It is further noted that Farnsworth states that the tread width is on the order of 185 to 200 millimeters. Thus, a middle cord layer might have an axial width of approximately 150 millimeters- this allows for an outermost layer to have an axial width of up to 180 millimeters. It is evident that the range of the claimed invention is broad and defines embodiments that are consistent with a plurality of tire designs.

Regarding claim 5, applicant requires that the cord to cord distance between the end of the middle cord layer and the adjacent outermost cord layer is greater than 0.15 times the cord to cord distance between the same end of the middle cord layer and the adjacent inner layer. A fair reading of Farnsworth as a whole suggests that the relevant distances would be approximately the same, as would be expected by one of ordinary skill in the art at the time of the invention. Thus, the cord-to-cord distance (defined by topping rubbers) between the middle cord layer the outermost cord layer would be approximately 1.0 times the cord-to-cord distance between the middle cord layer and the inner cord layer.

3. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farnsworth, Kohno, and Gaudin as applied in claim 1 above and further in view of Okamoto (US 5,779,828, of record).

As previously mentioned, the combination of references teaches or suggests all the limitations of claim 1. The references, however are silent with respect to the

employment of an end cover rubber having a wavy surface in accordance to the limitations of the claimed invention (peak to trough distance of between 0.05 and 0.25 mm). In any event, a variety of end cover rubbers are conventionally used in the ends of breaker or belt layers to prevent "belt end separation". Okamoto describes a specific type of end cover rubber in the belt region having a wavy surface and a peak to trough distance of between 0.05 and 0.25 mm, which mimics the range outlined by the claimed invention (Column 8, Lines 53-61). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the specified wavy end cover rubber, as suggested by Okamoto, in the general tire construction of either one of Bourdon or Farnsworth. The use of such a wavy end cover rubber provides reinforcement in both the radial and axial direction, further reducing the occurrence of "belt end separation", which is a desirable property in all pneumatic tire constructions.

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farnsworth, Kohno, and Gaudin as applied in claim 1 above and further in view of Imamura (US 3,913,652, of record).

As previously mentioned, the combination of references teaches or suggests all the limitations of claim 1; however, the references are silent with respect to the use of end cover rubber that is joined to a widthwise outer end face of the cord layer over a full periphery of the cord layer, as depicted in Figure 11. In any event, as stated in the previous paragraph, a variety of end cover rubbers are conventionally used in the ends of breaker or belt layers to prevent "belt end separation". Furthermore, Imamura depicts multiple arrangements of conventional end cover rubbers, including an embodiment in

which the end cover rubber is joined to a widthwise outer end face of the cord layer over a full periphery of the cord layer (Figure 1C). In describing the width of the end cover rubber or rubber reinforcing layer, Imamura provides multiple embodiments (Examples 4 and 5) in which the gauge of the end cover rubber is approximately 1 mm, which is well within the broad range of 0.05 to 5 mm defined by the claimed invention. As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to employ an end cover rubber in accordance to the limitations of the claimed invention, as suggested by Imamura, in the general tire construction defined by either one of Bourdon or Farnsworth. This particular type of end cover rubber represents one of many conventional such rubbers used to prevent "belt end separation" and would have been readily appreciated by one of ordinary skill in the art.

Response to Arguments

5. Applicant's arguments filed July 22, 2004 have been fully considered but they are not persuasive. Applicant contends that Gaudin teaches away from the claimed invention in that it specifically identifies the breaker strip arrangement of Figure 6 with the cord construction of Figure 2. Applicant further argues that the arrangement of Figure 6, for example, is not generally applicable to all breaker strip configurations. Lastly, applicant contends that the compression modulus (of the present invention) is carried out by the measuring method shown in Figure 7.

It is agreed that Gaudin describes a specific belt structure in which a high angled cord layer is disposed between an inner and outer low angle cord layer. However, in describing the axial widths of the respective belt layers, the teachings of Gaudin do not

suggest that the plurality of belt assemblies depicted in Figures 6-11 are only specific to the disclosed construction. Applicant is pointed to Column 1, Lines 35-40 in which Gaudin states, "Furthermore in **belt design**, it is desirable to stagger the ply endings in the edge regions of the belt by employing plies of different widths. This gives a progressive reduction in stiffness and minimized stress concentration at the belt edge." This description suggests that a staggered belt assembly is beneficial for **belt designs** in general- it is by no means specific only to the belt design of Gaudin. It is further noted that Farnsworth is consistent with these teachings, as depicted in Figures 3a-3c. While Farnsworth fails to depict all possible staggered assemblies, a fair reading of Farnsworth suggests that a plurality of belt constructions are within the scope of Farnsworth. Given the three belt construction of Farnsworth, there are only 6 possible designs (varying axial widths), three of which are expressly depicted in the above noted figures. It is emphasized that Farnsworth fails to place a criticality on the specific staggering assembly but rather stresses the importance of a high angled, metal cord layer radially outside a pair of low angle, metal cord layers- this is the same belt construction of the claimed invention. Regarding the purported unexpected results, the original disclosure only states that the benefits of cut resistance and separation resistance result from the outermost cord layer being wider than the middle cord layer- the original disclosure fails to associate any criticality to the relationship between the outermost cord layer and the innermost cord layer. In this regard, Farnsworth depicts multiple embodiments (Figures 3B and 3C) in which **the outermost, high angled cord layer is wider than the middle cord layer.**

Regarding the compression modulus, it is unclear if applicant is suggesting that the claimed property is not present in the coating rubber of Kohno- the arguments only state that a different method is performed in the inventive tire design as compared to usual measuring methods. While a different method might be used, Kohno does suggest the use of a high modulus material in an outermost belt layer in order to reduce local buckling of the cords- this is analogous to the benefits of improved buckling resistance set forth by the original disclosure. Thus, it is evident that the tire art has previously recognized the use of a high modulus material to form the outermost belt layer and one of ordinary skill in the art at the time of the invention would have readily appreciated the use of such a material in the tire construction of Farnsworth absent any conclusive showing of unexpected results.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin R Fischer whose telephone number is (571) 272-1215. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Blaine Copenheaver can be reached on (571) 272-1156. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Justin Fischer

Justin Fischer

August 16, 2004

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